# Guide to Good Stucco

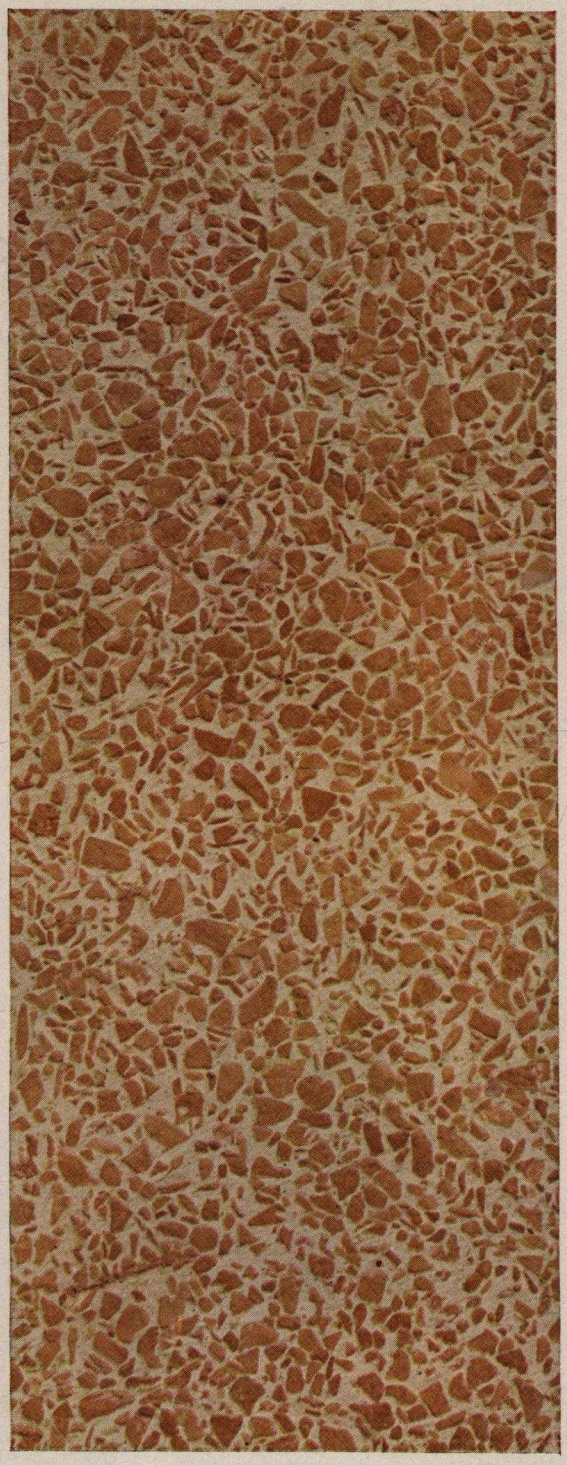
*including a New Method of Toning Stucco with Color Aggregates; also Complete Specifications*

*The Atlas Portland Cement Company*

*30 Broad St., New York :: Corn Exchange Bank Bldg., Chicago*

COLOR AGGREGATE STUCCO PLATE III

Made of one part Atlas-White Portland Cement, two parts white sand and 1-10 part hydrated lime. The yellow gravel was thrown on and pressed in. The use of white cement brings out the true color value of the pebbles, resulting in a rich, warm, mellow tone that years of aging could not give to plain white or gray stucco.



COLOR AGGREGATE STUCCO PLATE IV

Made of one part Atlas-White Portland Cement, one part white sand and two parts yellow marble screenings. The screenings were mixed with the cement and sand and applied as the finish coat of stucco. The surface was then washed to expose the yellow marble. The tone is a warm buff, with variety and richness.

GROUP OF STUCCO HOMES IN KANSAS CITY CONSTRUCTED WITH ATLAS-WHITE CEMENT

# Good Stucco

THE purpose of this book is to furnish contractors with the latest information and data on stucco construction to ensure good results.

Ever since the introduction of Atlas-White Portland Cement—and even before, when only gray cement was available—the use of stucco for home construction has been quite general. Recently its use has increased rapidly and steadily. Contractors have built thousands of stucco homes in cities, towns and country districts throughout America.

Today the urgent need of houses for our industrial workers is giving contractors a great opportunity and stucco a still wider use. Many important industrial housing projects are already under way. A great many more are forming. Stucco will be used more than any other type of construction in these operations because it is permanent, requires little or no painting or repairs, and gives lasting satisfaction.

Stucco lends itself to almost any type of architecture making a beautiful and distinctive home, at moderate cost, that is cool in summer, easy to heat in winter, resists fire and can be built entirely fireproof. In the long run it is the least expensive and most satisfactory construction for the home.

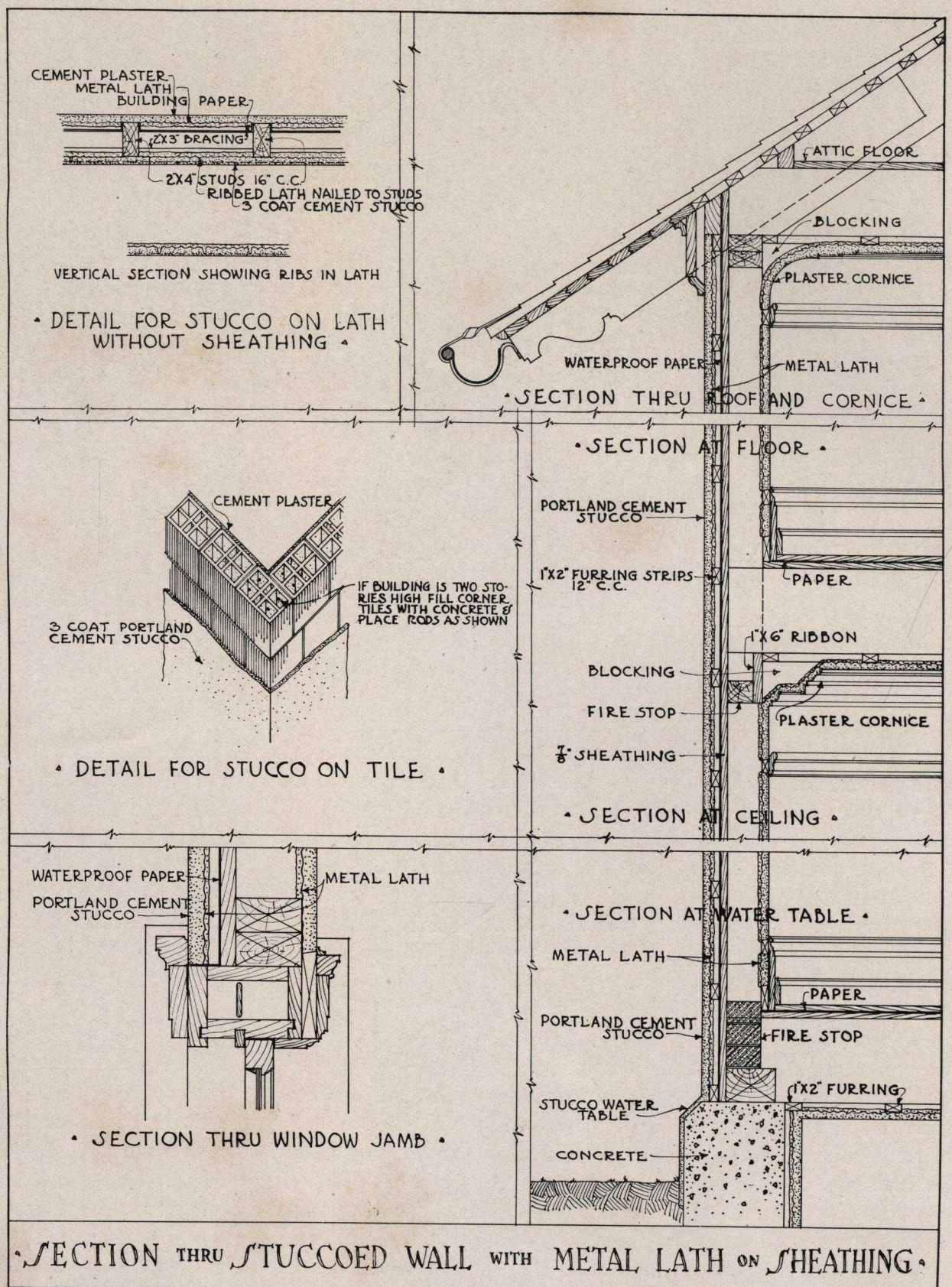
To the many general values of stucco can be added an even greater beauty and charm, by toning the finish coat with mineral pigments or color aggregates. In the latter method chips of brilliantly colored marble or granite screenings or warm toned sands and gravels are used. To bring out the full color effects of these aggregates, Atlas-White Cement should be used in the finish coat.

This method of toning stucco with color aggregates is described fully on page 9.

## More Business for Contractors

Aside from home construction, two fields rich in opportunity for contractors in stucco, are garages, and the overcoating of old frame and brick houses.

The desire for private garages is constantly growing. People appreciate that stucco makes a better appearing garage




# • SECTION THRU STUCCOED WALL WITH METAL LATH ON SHEATHING •

"INFORMATION FOR HOME BUILDERS", A BOOK CONTAINING INFORMATION AND ILLUSTRATIONS FOR PROSPECTIVE HOME BUILDERS, WILL BE SENT, UPON YOUR REQUEST, TO ANY OF YOUR CLIENTS WHO ARE THINKING OF BUILDING

than wood and one that is far more fireproof. This is so important to the average automobile owner that it is easy to convince him he should build in stucco. In our book "Choosing the Garage," this subject is covered fully. Send for a copy.

Overcoating old brick or wood houses with stucco makes them fresh, new, and attractive. This can be done, with even some remodeling, at far less cost than building anew. Contractors will find this class of work profitable and not difficult to secure. This subject is treated more fully on page 22, also in our book "New Homes for Old." Send for a copy.

## Materials for Stucco Construction

Stucco is a mixture of Portland cement, sand, lime and water.

The *sand* must be properly graded and free from impurities like loam, salt, vegetable or other deleterious matter. If it contains impurities it must be thoroughly washed before using.

The addition of one part of *lime* to about ten parts of cement makes the stucco more plastic, and fattens the mortar so that it will cover more surface and work easily under the float.

Either hydrated or slaked lump lime may be used. The advantage of using *hydrated lime* is that it is thoroughly slaked and never burned in the mechanical process of slaking or hydrating. There is no danger of placing unslaked lime in the stucco, and hydrated lime never air slakes.

If ordinary *lump lime* is used, slake a good double strength lime in plenty of water and stir just enough to keep the large lumps from burning. After standing a week or ten days it is ready for use. The lump lime should be slaked in a box raised slightly from the ground with one end lower than the other. Then the slaked lime will run off. The lower end should have a sliding door, with the opening covered by coarse wire screen. This acts as a strainer and prevents unslaked lime from leaving the box. After complete slaking, the lime is run off into a crater of sand. The lime is thoroughly mixed with enough sand to form a thick paste. About one part of lime putty to nine of sand is needed. The cement and the remainder of the sand are added just before the mortar is applied.

*Hair or fibre* is often used in the first stucco coat. The best results are obtained with first quality long cattle or goat hair, or long fibre well combed out. These should be free from foreign matter.

The *water* used for mixing must contain no oil, acid, strong alkalies or vegetable matter. Their presence retards the setting of the stucco and permanently weakens the wall.

## Mixing the Mortar

The proportions are three parts of sand for the first two coats and two and one-half parts for the third, to one part of Portland cement; and one part of lime to ten of cement. Measure by volume. A bag of cement (94 pounds net) contains about one cubic foot.

Mix on a water-tight platform to prevent loss of water after the proportions of the mix have been secured. Mixing must be continued till the mortar is uniform in color, indicating that the cement and lime are uniformly distributed. Then add hair or fibre if it is to be used.

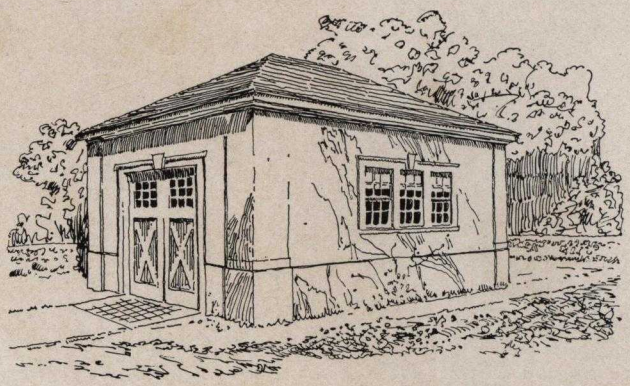
## Three Kinds of Stucco Construction

There are three kinds of stucco construction:

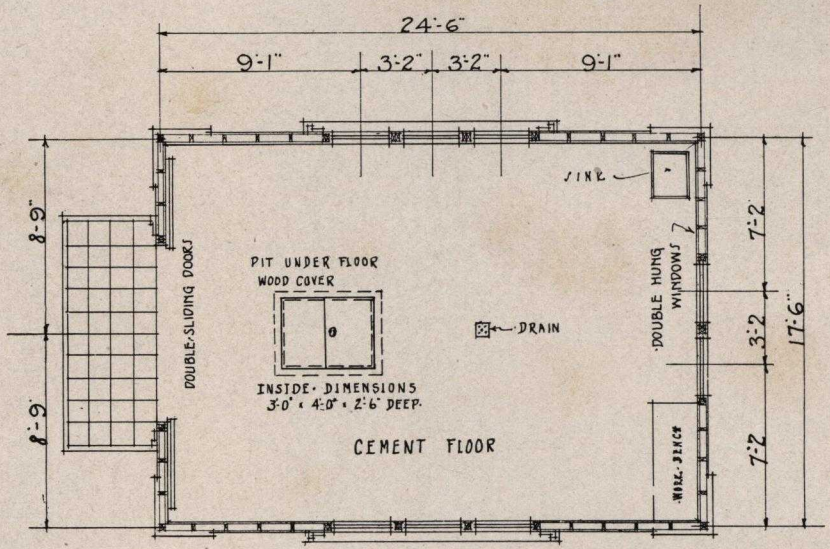
(1) On stucco board, wood or metal lath—with wood sheathing.
(2) On ribbed metal lath—without wood sheathing.
(3) On brick, stone, hollow tile, or cement blocks.

# WOOD STUD GARAGE WITH ATLAS WHITE STUCCO AND WOOD ROOF

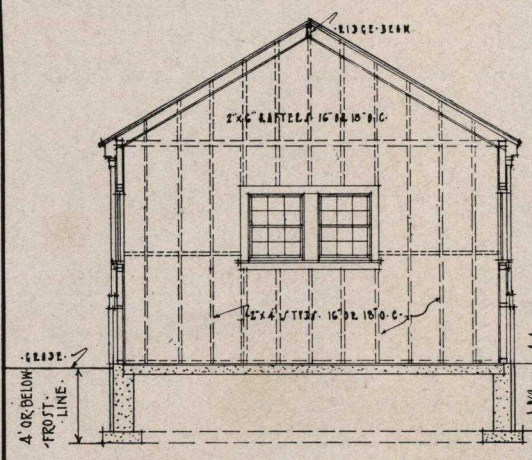
THE ATLAS PORTLAND CEMENT CO.
NEW YORK CHICAGO



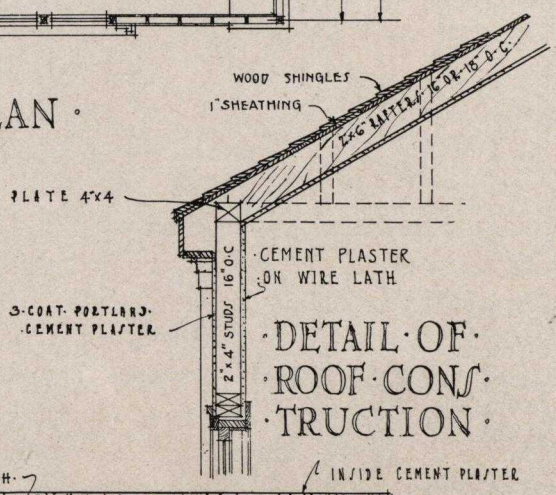
PERSPECTIVE VIEW



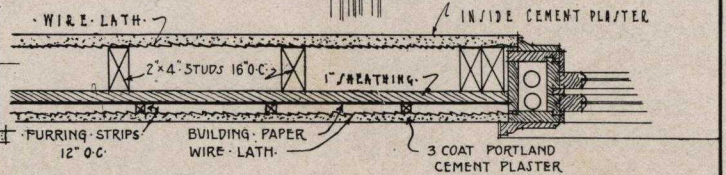

PLAN




SECTION




DETAIL OF ROOF CONSTRUCTION




WALL DETAIL WITH WIRE LATH

COMPLETE INFORMATION ON VARIOUS TYPES OF STUCCO AND CONCRETE GARAGES IS GIVEN IN ATLAS GARAGE BOOK, SENT FREE UPON REQUEST

*Patent Stucco Board* is sometimes used in place of wood lath. It costs less than metal lath, requires no furring and when applied is ready to receive the first coat of stucco.

With *wood lath* the sheathing is nailed to the studs, then covered with sheathing paper; vertical wood furring strips are applied, and the lath put on them horizontally.

Wood lath should be thoroughly saturated with water before mortar is applied, or its moisture will be absorbed by the wood. Sometimes wood lath is painted with two coats of any reputable bitumen waterproof paint to which mortar adheres. After twenty-four hours and within six days of painting, stuccoing should be started.

*Metal lath on wood sheathing* is better construction than wood lath on wood sheathing. Both expanded metal lath and woven wire lath are used. The expanded metal type consists of metal sheets about 1-40 inch in thickness. They are slotted and expanded to form variously shaped mesh. Woven wire lath is a close-mesh wire with V-shaped metal stiffeners. Most metal laths are now manufactured with raised ribs, designed to eliminate furring by direct application to the sheathing. This increases speed of erection and reduces cost.

In applying stucco to metal lath the mortar should be thoroughly pushed through against the inside waterproofing to embed the metal of the lath completely on both sides. If furring strips are used, the voids around them, and where laths lap, must be filled.

*Ribbed metal lath without wood sheathing* (or "solid stucco" construction) has grown with the development of rib-reinforced metal laths. The ribbed metal lath is attached, ribs inward, direct to the studding, the ribs acting as furring and reinforcement. The metal lath is plastered both back and front, forming a solid slab of reinforced Portland cement mortar. Solid stucco costs a little less than stucco on hollow tile, cement block or brick.

*On new brick, stone, hollow tile or cement block*, stucco mortar is applied directly to the material. The surfaces must be amply rough or absorbent to assure a strong bond and key with the stucco. Standard specifications prescribe mortar joints at least ⅜-inch thick, with the mortar omitted or raked out at least ½-inch back from the face. The surface should be thoroughly cleaned and saturated with water just before the first coat is applied. The stucco is then forced into the joints.

## Applying Stucco Mortar

Three coats of mortar is generally accepted as proper construction. Recent investigations indicate a two coat mortar to be just as satisfactory. We will describe the three coat method.

Make the first coat ⅜-inch thick over the face of the lath, the second coat likewise ⅜-inch, the final coat ¼-inch. In solid stucco on ribbed metal lath without sheathing, the first coat is ⅜ to ½-inch, and back-plastered to the same amount; the second coat is ⅜ to ½-inch; the finish coat, not less than ¼-inch.

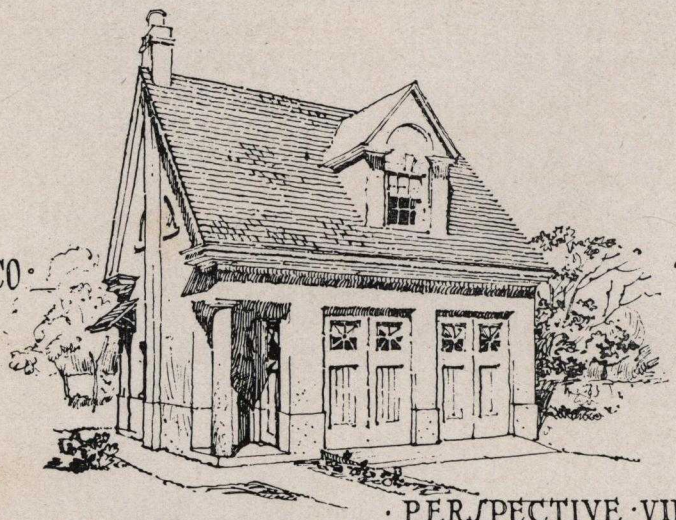
In two coat stucco the first coat should be ⅝-inch, the second coat ⅜-inch.

The thickness of the coats and the care with which they are applied gives stucco its durability. The treatment of the finishing coat gives it beauty and distinctiveness. White cement should be used in the final coat. It gives a wide variety of beautiful finishes and brings out the true color value of aggregates.

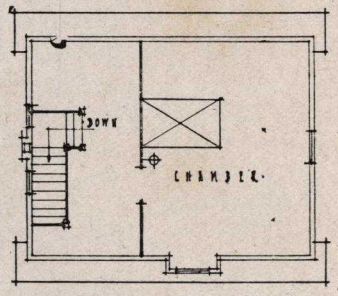
Where stucco is toned with color aggregates, care in applying is necessary to get the best results. The two methods—"integral" and "cast on"—by which stucco is given these beautiful permanent tones are well worth the careful consideration of every contractor.

# HOLLOW TILE GARAGE
## WITH
## ATLAS WHITE STUCCO
## AND
## WOOD ROOF

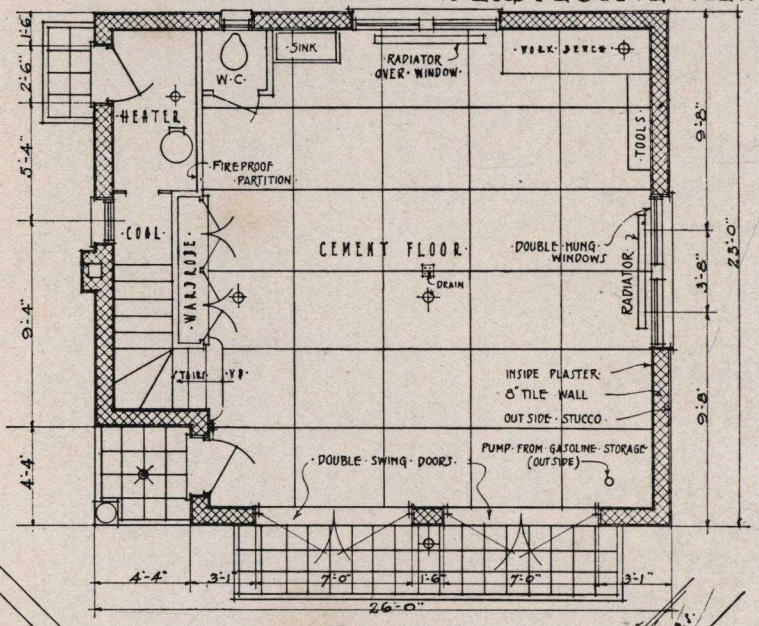
THE ATLAS PORTLAND CEMENT CO.
NEW YORK CHICAGO



PERSPECTIVE VIEW




PLAN OF SECOND FLOOR

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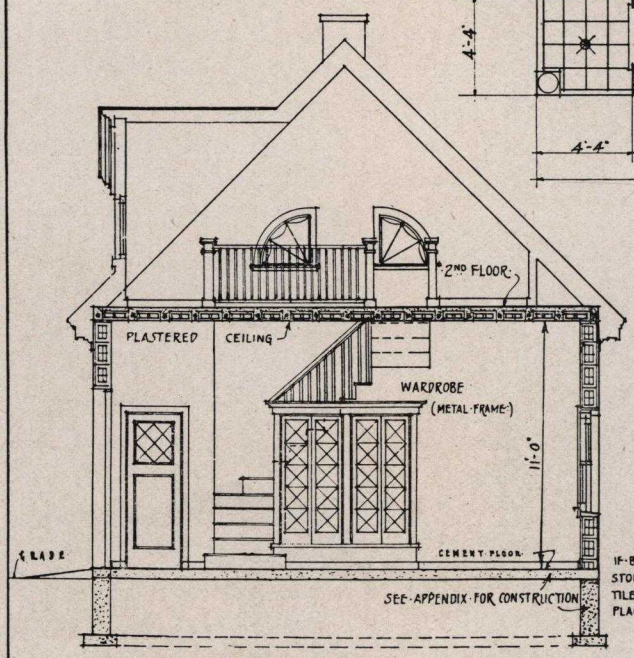


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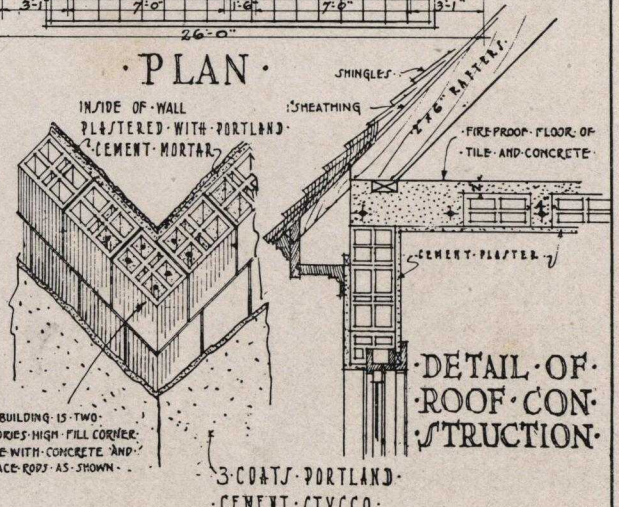



DETAIL OF ROOF CONSTRUCTION

DETAIL OF CORNER OF 8" HOLLOW TILE WALL

THIS IS ANOTHER FULL PAGE GARAGE DETAIL PREPARED BY THE ATLAS SERVICE DEPARTMENT
THE ATLAS GARAGE BOOK IS YOURS ON REQUEST

In the *integral method* the color aggregate or aggregates are mixed with the sand and cement and applied as the finish coat of stucco. The surface, after it has hardened slightly, is then washed to remove the thin film of cement which covers the aggregates and to expose their full color values. To remove this film requires care and skill. After the stucco has set about two hours, it is scrubbed with a household scrubbing brush and clean water—but care must be taken not to disturb the aggregates. Some contractors have secured good results by mopping the surface with a large sponge. This removes the cement film without any danger of disturbing the aggregates. Other contractors wash the stucco after it has become slightly harder, with a solution of one part muriatic acid to five parts of clean water; but care must be used not to wash too much of the cement away and to spray the stucco with water immediately after washing to remove all traces of the acid.

In the *cast on method* the color aggregate or aggregates are thrown on the finish coat of white stucco while it is still fresh and lightly pressed in with the float. This produces a variety of textures and irregularity of surface that many believe is more artistic than the effects secured by the integral method. An unusual charm of surface is possible if skill is used in casting on the aggregate, so that it will not appear too regular. A contractor whose skill has produced such an effect in one house is sure to have many others, for architects are seeking just such effects for their finest work.

## Stucco Finishes

The following finishes are applicable to gray, white, or colored Portland cement stucco. They derive their names from the methods that create the surfaces.

Smooth Troweled—the finish coat is smoothed with a metal trowel, rubbing as little as possible.

Stippled—the finish coat is smoothed with a metal trowel, rubbing as little as possible, and is then lightly patted with a broom straw brush to give an even stippled surface.

Sand floated—the finish coat, after being brought to a smooth, even surface, is rubbed with a wood float, using a circular motion and a little sand to roughen the surface slightly. This floating should be done within thirty minutes after the application, never later. If done after thirty minutes the initial set of the stucco is disturbed.

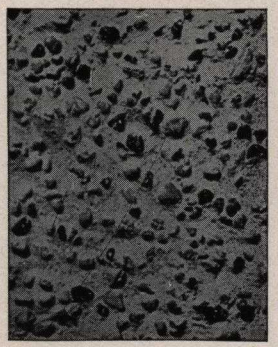
Sand sprayed—After the finish coat has been brought to an even surface, it is sprayed with a wide, long fibre brush—a whisk-broom does very well—dipped into a creamy mixture of equal parts of cement and sand, mixed fresh every thirty minutes, and kept well stirred in a bucket.

This coating is thrown forcibly against the surface while still moist and before its

Spatter Dash Stucco Finish

Floated Stucco Finish

Stippled Stucco Finish



Pebble Dash Stucco Finish

final set—i.e., within three to five hours. To obtain lighter shades, add hydrated lime of five to fifteen per cent of the volume of the cement, or use Atlas-White Portland cement.

Spatter Dash or Rough Cast—After the finish coat has been brought to an even surface and before attaining final set, it is scratched and then a uniform mixture of one part cement and two parts of sand, thrown forcibly against it to produce a rough surface of uniform texture, when seen from a distance of twenty feet. This finish must dry out slowly. Be careful to prevent rapid drying.

Pebble-Dash—After the finish coat has been brought to a smooth, even surface, and before its initial set, clean round pebbles or other material, as selected, not smaller than ¼-inch or larger than ¾-inch previously wetted—are thrown forcibly against the surface so as to embed themselves in it. They may be pushed back into the mortar with a clean wood trowel, but the surface should not be rubbed after the pebbles are embedded.

Exposed Aggregates (Integral Method)—The final coat for this finish is composed of an approved, selected coarse sand, marble screenings, granite screenings, or other special aggregates, in the proportion given for finishing coats. After application and trowelling, but before the initial set, wash the surface to remove the thin film of cement which coats the aggregates, so as to expose their true color values. The method for washing is fully described on page 9.

Exposed Aggregates (Cast on Method)—For this finish use the same method as for Pebble-Dash.

## Guides to Good Stucco

THE following suggestions are guides to good stucco.

Protect all materials when delivered for the work. Avoid damp places.

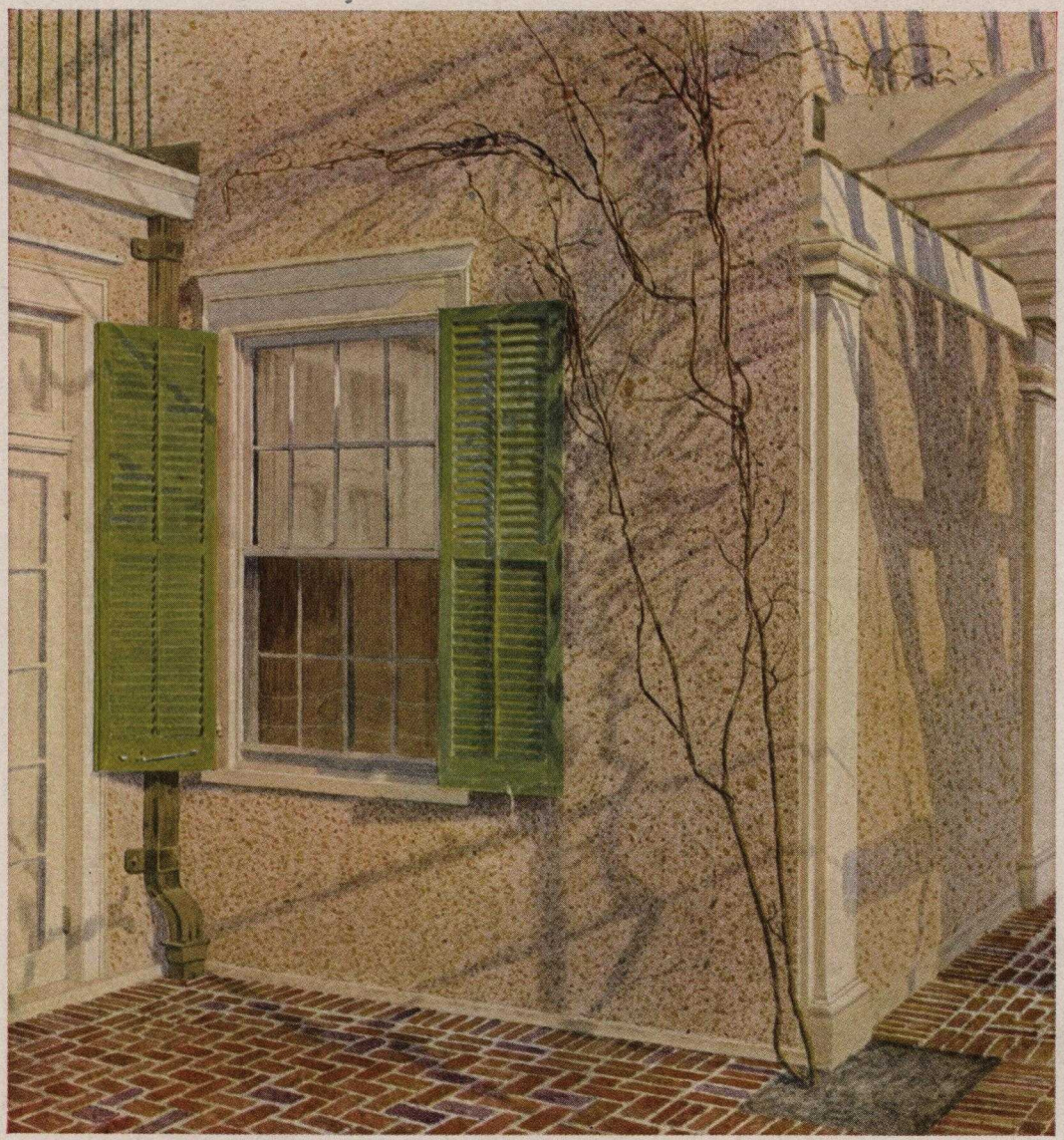
Never use retempered stucco (stucco which has begun to set and is then moistened). Always mix the various ingredients thoroughly in small batches at a time. Start plastering at the top, and carry it downward continuously, without allowing the stucco to dry at the bottom edge. If it is impossible to work the full width of the wall at one time, have the break at some natural division of the surface—window or door.

Shield all fresh surfaces against rain or hot sun.

Too rapid drying weakens stucco. Cover it with a wet canvas or spray the surface frequently when exposed to the sun or wind. Never mix or apply stucco in freezing weather; the water will freeze before the stucco has set. This prevents hardening. Artificial methods of keeping cement mixtures warm before application are discouraged. Plan stucco work to avoid winter. Don't disturb the stucco after it has begun to set, for then its adhering quality is ruined.

In the application of the various coats, roughen the first or scratch coat thoroughly before the second coat is applied. Keep each coat damp before the application of the following coat, to prevent any absorption of the water from the latter.

If you use mineral pigment, be absolutely sure that each batch of stucco is mixed in exactly the same proportions as the preceding one, and with the same amount of water.



*Detail of Residence of J. C. Baldwin, Jr., Mount Kisco, New York. Benjamin W. Morris, Architect.*
*A reproduction of the aggregate toned stucco used in this residence is shown on page 12, Plate XXIII.*

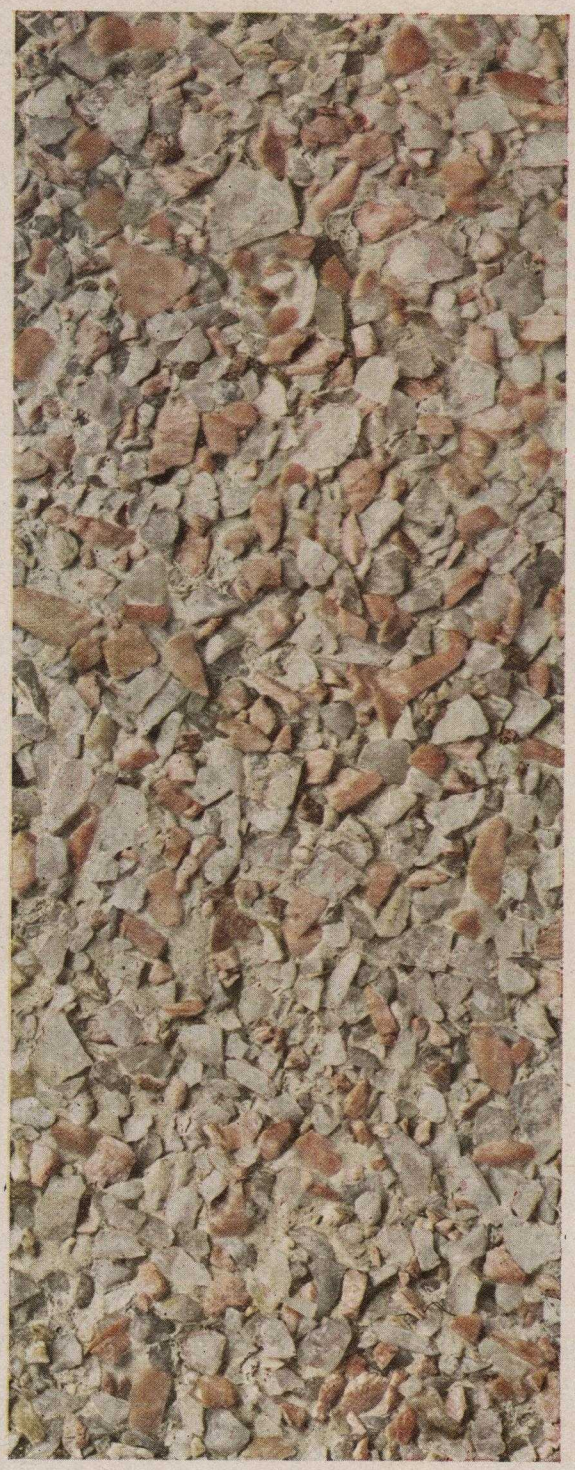
# Color Tones in Stucco

WHITE Portland cement produces exquisite pure white effects and shows the true value of any color added to it. Three methods are used to color white cement stucco:

1. Coatings.
2. Pigments.
3. Aggregates.

Coatings have not been entirely satisfactory. They destroy the texture and are generally temporary.

Pigments are more satisfactory if care is used in mixing them and applying the stucco. Mineral pigments are best but they must be of high grade. Yellow ochres produce a wide variety of warm shades. Genuine French ochre is safe to use. Cream, buff and brown effects are the most permanent. For these tones use two pounds of color to each bag of cement. For medium shades, three pounds to each bag of cement.



COLOR AGGREGATE STUCCO PLATE XXIII

This is the stucco used in the Baldwin Residence on page 11. It consists of one part Atlas-White Cement, one part white quartz and pink feldspar dust, mixed and applied as finish coat. While plastic, one part quartz and three parts feldspar (¼ to ⅜-inch grits) were thrown on and lightly pressed in with a float.

The drawback to stucco toned with pigments or coatings is the flat, monotone effect given the surface. This is avoided by toning stucco with color aggregates which give the surface life, character, variety of color and texture.

Early in 1916 The Atlas Portland Cement Company began experiments in toning stucco with color aggregates. Yellow, pink, light red and green marble and granite screenings, or colored sands and gravels, were used. Each experimental panel was made up in both white and gray cement. Only the white cement panels are reproduced, because the color values of the aggregates were lost with the gray cement. During 1917 other experiments were undertaken with the view of increasing the charm of texture by casting on color aggregates or combinations of aggregates. Some of these new experiments are now shown. From the reproductions, it will be seen that unlimited effects in color and texture may be secured by contractors who use this method of toning stucco, and are desirous of securing distinctive stucco effects.

The average size house requires only about two cubic yards of these color aggregates. They are quarry waste crushed to size, and used in the finish coat only. So the cost is not great, even when the aggregates are secured from a distance.

As the aggregates constitute the greater bulk of the mortar, any normal inaccuracy in measurement makes but little difference —in fact, the slight variation is agreeable. Therefore, this new method distributes the color far more simply and reliably than toning stucco with mineral pigments, when the slightest inaccuracy in measurement gives marked difference in tone.

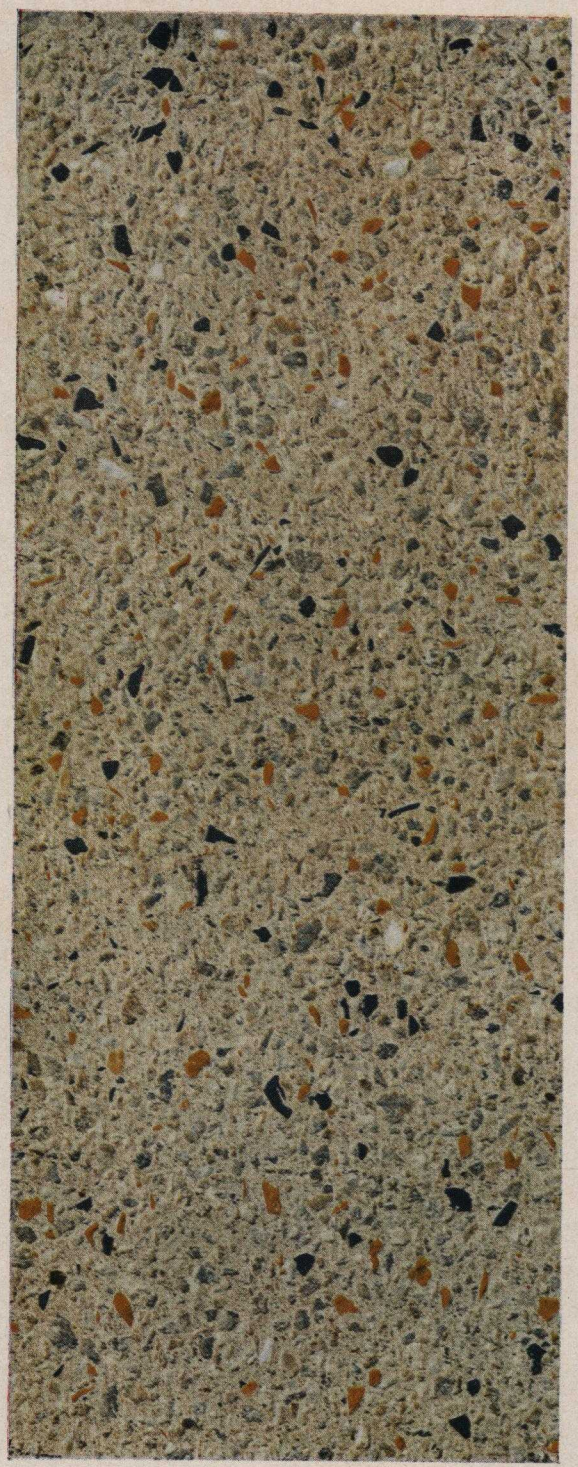
Stucco toned with color aggregates is also sure to be permanent in its color effects, because the aggregates are nature's own colors and retain their beauty indefinitely.

COLOR AGGREGATE STUCCO PLATE X

Made of one part Atlas-White Portland Cement, one part white sand and two parts naturally variegated gravel. The gravel was mixed with the cement and sand and applied as the finish coat of stucco. The surface was then washed to expose the gravel. The tone has variety, charm, individuality and richness.

COLOR AGGREGATE STUCCO PLATE XIX

Made of one part Atlas-White Cement, two parts white sand, mixed and applied as finish coat; while still plastic, Pompton pink granite screenings, size No. 2, were cast on and pressed in lightly with a float. The pink and green colors of the aggregate would be lost entirely with gray cement, but Atlas-White Cement brings them out.



COLOR AGGREGATE STUCCO PLATE XI

Made of one and one-half parts Atlas-White Cement, three parts white sand, and two parts of aggregates composed of two parts green marble, No. 1 size, one-tenth part yellow marble, No. 1 size, and one-tenth part black marble, No. 1 size. These were mixed together, applied as finish coat and surface washed to expose aggregates.

COLOR AGGREGATE STUCCO PLATE XIV

Made of one part Atlas-White Cement and two parts of white sand. There was cast on, while surface was fresh, the same mixture of aggregates as was used in Plate XI. The aggregate was pressed in lightly with a clean wood float. Hold this reproduction at a distance of five or ten feet to get the full effect of the color and texture.

# Location of Colored Aggregates

THERE are many available sources of colored aggregates in the United States. This partial list, compiled for your information and guidance, will be added to continually, as definite information is secured. You doubtless can add to it from your knowledge of local deposits. You and the architect, being familiar with the setting of the house, the chosen color scheme, and working with your own choice of aggregates and formulae, will naturally produce results surpassing our initial efforts.

## Marble and Granite

| *Firm Name and Address* | *Pink* | *Yellow* | *Red* | *Green* | *White* | *Black* | *Gray* |
|---|---|---|---|---|---|---|---|
| Cardiff Green Marble Co., Cardiff, Md. | | | | Marble | | | |
| Georgia Mineral Products Co., Tate, Ga. | Marble | | | | Marble | | Marble |
| Juventy & Cornelis, New York City | Marble | Marble | Marble | Marble | Marble | Marble | |
| Wisconsin Granite Co., Chicago | Granite | | Granite | | | Granite | Granite |
| Northern Granite & Stone Co., Cleveland | Granite | | Granite | | | Granite | Granite |
| Webb Pink Granite Co., New York City | *Granite | | | | | | |
| Western Brick & Supply Co., Lincoln, Neb. | Marble | | | | Marble | | Marble |
| Sylvan Green Marble Co., Easton, Pa. | | | | Marble | | | |
| C. D. Jackson & Co., New York City | | Marble | Marble | Marble | Marble | | Marble |
| Hurkins-Willis Lime & Cem't Co., St. Louis | Granite | | Granite | Granite | Granite | Granite | |
| Va. Marble & Onyx Co., Huntington, W.Va. | Marble | Onyx | | | | Marble | |
| National Mosaic Tile Co., Chicago | *Granite | Granite | Granite | Granite | Granite | Granite | |
| Bedford Mining Co., Bedford, N.Y. | Feldspar | | | | Quartz | | |
| Northwestern Marble Co., Minneapolis | Marble | Marble | Marble | Marble | Marble | Marble | *Marble |
| Oklahoma State Reformatory, Granite, Okla. | | | *Granite | | | | |
| Detroit Marble Mosaic Co., Detroit, Mich. | | Marble | Marble | Marble | Marble | Marble | |
| Drake Marble & Tile Co., St. Paul, Minn. | Marble | | Marble | Marble | Marble | Marble | Marble |
| J. W. Barwell, New York City | (Pompton Pink Granite consisting of Pink, Green, Black, White in one aggregate) | | | | | | |
| Conlin & Co., Tuckahoe, N.Y. | | | | | Marble | | |
| Wm. Bradley & Sons, L.I.C., N.Y. | | Marble | | | Marble | | |
| Art Marble Company, Chicago | Marble | | Marble | Marble | Marble | Marble | |
| Cassini Mosaic & Tile Co., Cincinnati, O. | | Marble | Marble | Marble | Marble | | |
| Sunderland Bros. Co., Omaha, Neb. | Marble | | | Marble | Marble | | *Marble |
| Pacific Mineral Products Co., Los Angeles | | Jasper | Jasper | Granite | Quartz | Granite | Granite |
| Robert Rossman Co., Chicago | | Marble | Marble | Marble | | Marble | |
| Crown Point Spar Co., New York City | | | | | Feldspar | | |
| P. Grassi & Co., San Francisco | | | | | Marble | Marble | |

*Indicates light color.

## Sand and Gravel

| | |
|---|---|
| Phoenix Sand & Gravel Co., N. Y. C. | Cowe Bay Yellow Sand and Yellow Grits |
| Goodwin, Gallagher Sand & Gravel Co., N. Y. C. | Screenings in various grades and colors |
| Henry Steers Sand & Gravel Co., N. Y. C. | Grit in various grades and colors |
| Roslyn Steel & Cement Co., Washington, D. C. | Potomac River Gravel. Size A & B |
| Ohio & Michigan Sand & Gravel Co., Toledo, Ohio | Torpedo Grits |
| Worcester Brick Co., Worcester, Mass. | Sand and gravel in various grades and colors |
| F. R. Upton, Newark, N. J. | Franklin Sand |

# Specifications for Stucco

THE following stucco specifications embody the best practice of prominent architects, and contain complete notes on the new method of toning stucco with color aggregates. Contractors will find these suggestions of value in obtaining good stucco construction.

Three separate columns are provided for the different types of construction—one for stucco on masonry walls, one for stucco on sheathed frame walls, and the third for stucco on skeleton frame walls. Materials and methods peculiar to one form of construction occur only in its particular column. Requirements common to all forms carry across all three columns. Variable parts are in italics.

For convenience of reference, all notes have been placed immediately following the specification paragraph to which they apply.

## Stucco Work

| | BRICK AND HOLLOW TILE WALLS | SHEATHED FRAME WALLS | SKELETON FRAME WALLS |
|---|---|---|---|
| Scope. | 1. The work required under this *section of the* specification comprises the stuccoing of all exterior wall and chimney surfaces, as shown on the drawings and hereinafter described.<br>NOTE.—When a separate specification is written for the stucco work, the words in italics will be omitted. | | |
| General Conditions. | 2. Attention is called to the General Conditions, in the fore part of this specification, which apply equally to all trades.<br>NOTE.—When a separate specification is written for the stucco work, the general conditions governing the work will be placed here instead of the reference in paragraph 2. | | |
| Protection. | 3. All materials shall be properly protected while stored at the site and shall not be placed on the ground. Fresh stucco shall be protected against the weather. No stucco in which cracks, pits, streaks, discolorations, or other defects may occur will be accepted. | | |
| Cement. | 4. Cement shall be Atlas Portland Cement for undercoats and Atlas White Portland Cement for finish coat. | | |
| Aggregate. | 5. Aggregate for undercoats shall be thoroly clean sand, graded from fine to coarse grains, with the coarse predominating, and shall be free from loam, salt, vegetable and other deleterious matter.<br>NOTE.—The binding qualities of the cement are adversely affected unless sand is as above described; and if the sand is not naturally clean, it should be washed after its removal from the bank.<br>By grading sand from fine to coarse, a more dense and more waterproof mortar is obtained. | | |
| | 6. Aggregate for finish coat shall be thoroly clean *yellow gravel grit*.<br>NOTE.—Alternatives for the material in italics are: yellow and red marble screenings, gravel grit of variegated colors, pink and green granite screenings, etc. | | |
| Lime. | 7. Lime shall be (state brand) hydrated lime.<br>NOTE.—The admixture of a small quantity of hydrated lime in stucco mortar does not materially decrease its strength and it does, to a marked degree, increase its plasticity, making it work more freely under the trowel. | | |
| Waterproofing Compound. | 8. Waterproofing compound shall be (state brand, etc.).<br>NOTE.—Under extensive experiments, hydrated lime has proven generally successful as a waterproofer of stucco. | | |

| | BRICK AND HOLLOW TILE WALLS | SHEATHED FRAME WALLS | SKELETON FRAME WALLS |
|---|---|---|---|
| Color Pigments. | 9. Coloring matter shall be (state brand) dry color pigments.<br>NOTE.—When color is to be produced other than by the use of colored aggregate, mineral colors only should be employed. They should be of the highest degree of purity, of substantially the same specific gravity as the cement, and unaffected by lime, cement or the action of the elements. | | |
| Hair. | | 10a. Hair shall be first quality long cattle or goat hair. | 10b. Hair shall be first quality long cattle or goat hair. |
| Water. | 11. Water shall be clean and free from acids or strong alkalies. | | |
| Furring. | | 12a. Galvanized or painted half-inch crimped furring not lighter than 22-gauge, shall be fastened over the sheathing paper and directly along the line of the studs, using 1¼-inch 14-gauge galvanized or painted staples, placed 12 inches apart. | 12b. Galvanized or painted half-inch crimped furring not lighter than 22-gauge, shall be fastened directly to the studding, using 1¼-inch, 14-gauge galvanized or painted staples, placed 12 inches apart. |
| Lath. | | 13a. (Expanded Metal) Lath shall be (give maker's name) expanded metal, weighing not less than 3.4 pounds per sq. yd., galvanized or painted after expansion. | 13b. (Expanded Metal) Lath shall be (give maker's name) expanded metal, weighing not less than 3.4 pounds per sq. yd., galvanized or painted after expansion. |
| | | 14a. (Wire Cloth) Lath shall be (give maker's name) 19-gauge wire, woven 2½-meshes to the inch, galvanized or painted after being woven.<br>NOTE.—Paragraphs 13a and 14a are alternatives. An improved form of construction taking the place of the furring (paragraph 12a) and the lath (paragraph 13a or 14a) is an expanded metal lath combining furring in the form of an integral stiffening rib, or a wire cloth with a V-stiffening. | 14b. (Wire Cloth) Lath shall be (give maker's name) 19-gauge wire, woven 2½ meshes to the inch, galvanized or painted after being woven.<br>NOTE.—Paragraphs 13b and 14b are alternatives. An improved form of construction, taking the place of the furring (paragraph 12b) and the lath (paragraph 13b or 14b) is an expanded metal lath, combining furring in the form of an integral stiffening rib, or a wire cloth with a V-stiffening. |
| | | 15a. Place lath horizontally over the furring, driving 1¼-inch 14-gauge galvanized or painted staples 8 inches apart over the furring. The sheets of lath shall be locked or lapped at least 1-inch and tied at joints between studs, both vertically and horizontally, with 18-gauge wire. The lath shall be folded around the corners at least 3 inches. | 15b. Place lath horizontally over the furring, driving 1¼-inch 14-gauge galvanized or painted staples 8 inches apart over the furring. The sheets of lath shall be locked or lapped at least 1-inch and tied at joints between studs, both vertically and horizontally, with 18-gauge wire. The lath shall be folded around the corners at least 3 inches. |

| BRICK AND HOLLOW TILE WALLS | SHEATHED FRAME WALLS | SKELETON FRAME WALLS |
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Mortar.

16. Mortar for first and second coats shall be composed of not less than one (1) part of Portland Cement, three (3) parts of sand and one-tenth (1-10) part of hydrated lime by volume.

17a. Hair may be added to the first coat mortar but in quantity only sufficient to bond the mortar.

NOTE.—Hair is added to the first coat of mortar on metal lath to hold the mortar together on the lath, otherwise there would be considerable waste due to the mortar dropping behind the lath, but no greater quantity than is necessary to accomplish this purpose should be used, as an excessive amount of hair will prevent the mortar from going thru the lath sufficiently to thoroly embed the metal and so preserve it from corrosion.

17b. Hair may be added to the first coat mortar but in quantity only sufficient to bond the mortar.

NOTE.—Hair is added to the first coat of mortar on metal lath to hold the mortar together on the lath, otherwise there would be considerable waste due to the mortar dropping behind the lath, but no greater quantity than is necessary to accomplish this purpose should be used, as an excessive amount of hair will prevent the mortar from going thru the lath sufficiently to thoroly embed the metal and so preserve it from corrosion.

18. Mortar for finishing coat shall be composed of not less than one (1) part of White Portland Cement, three (3) parts of aggregate and one-tenth (1-10) part of hydrated lime by volume.

NOTE.—If a waterproofing compound is to be used, the reference to lime in paragraph 18 should be stricken out and a description of the waterproofing compound inserted.

19. The finishing coat shall be brought to a tone selected by the addition of dry color in quantity not exceeding 10 per cent of the weight of the cement.

NOTE.—An excess of color weakens the mortar. Stucco made with White Portland Cement responds more quickly to color tones.

20. Proportions stated are by volume and one bag (94 pounds) of cement is to be considered as one cubic foot.

Mixing.

21. Mixing shall be done on a water-tight platform, the different constituents thoroly mixed dry to a uniform color, water then added to obtain the proper consistency and the whole turned over until the mass is uniform in color and consistency.

22. There shall not be mixed at one time more mortar than will be used within one hour. No retempered mortar shall be used under any circumstances.

NOTE.—Cement is likely to take its initial set within one hour after mixing, and in even less time during the hot summer months. The practice of retempering mortar after it has taken its initial set, cannot be too strongly condemned.

23. The dry color in the finishing coat shall be very carefully weighed or measured and thoroly mixed with the sand. The cement and lime shall then be added and the entire mass thoroly mixed by shoveling, from one side of the platform to the other, thru a ¼-inch mesh screen; when the batch is of uniform color the water shall be added.

NOTE.—The water, as well as the other constituents, should be carefully measured so that each batch will be of the same consistency.

Mortar Application.

24. The stucco shall be applied in three coats, each coat not less than ¼-inch or more than ⅜-inch in thickness, the whole finishing

24a. The stucco shall be applied in three coats, each coat not less than ¼-inch or more than ⅜-inch in thickness, the whole finishing

24b. The stucco shall be applied in three coats and back-plastered one coat, the whole finishing 1½ inches thick, with the outside face

| | BRICK AND HOLLOW TILE WALLS | SHEATHED FRAME WALLS | SKELETON FRAME WALLS |
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| Mortar Application. *Continued* | ⅞-inch thick beyond the normal masonry line. The plastering shall be carried on continuously in one general direction, without allowing the mortar to dry at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface. Stucco shall not be applied when the temperature is below freezing. Masonry surfaces shall be cleaned and thoroly saturated with water just before the first coat of mortar is applied. See note following 28. | 1-inch thick over the furring strips. The plastering shall be carried on continuously in one general direction, without allowing the mortar to dry at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface. Stucco shall not be applied when the temperature is below freezing. | 1-inch beyond face of studs. The finishing coat shall be not less than ¼-inch in thickness. The plastering shall be carried on continuously in one general direction, without allowing the mortar to dry at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface. Stucco shall not be applied when the temperature is below freezing. |
| | 25. The first coat shall be applied under pressure to secure a good bond. | 25a. The first coat shall be applied under pressure so that the mortar will be forced through the lath and completely embed the metal on both sides. This cannot be done if excessive quantity of hair is used. Special care shall be taken to fill all voids around furring strips and where lath laps. | 25b. The first coat shall be applied under pressure to secure a good key, and after it has set shall be back-plastered on the inside or back surface of the lath to a thickness of ½-inch. |

26. After the first coat has set but before it has dried, the second coat shall be applied and floated *to a true plane with wood screeds placed at 5-foot intervals and about openings*.

NOTE.—Where a surface having inequalities is desired, the words in italics should be omitted.

27. After the second coat has become set and hard (no earlier than 3 days) the finishing coat shall be applied and finished as hereinafter specified.

28. The undercoats shall be cross-scratched before the initial set has taken place and shall be thoroly wetted before the succeeding coats are applied. The finishing coat shall be kept moist for at least four days, either by gently spraying with water after the mortar has hardened sufficiently to permit it or by hanging wet burlap or other fabric over the surface.

NOTE.—To fully develop its binding properties, cement requires moisture continuously during the period of crystallization. For this reason masonry surfaces and undercoats are saturated so that they will not absorb the water from succeeding coats and the finish coat is kept moist by either gently spraying the stucco itself or by soaking burlap curtains hung about 6 inches away from the stucco. The latter provision is particularly necessary during the hot summer months in order to prevent the evaporation of the water in the finished surface, which is the cause of crazing or hair cracks.

Surface Finish.

29. (Exposed Aggregate—Integral Method.) The finishing coat shall be ⅜ inch thick, and shall be treated as soon as possible so as to remove the film of cement and sand from the coarse aggregate and in such a manner as not to loosen the coarse aggre-

| | BRICK AND HOLLOW TILE WALLS | SHEATHED FRAME WALLS | SKELETON FRAME WALLS |
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| Surface Finish. *Continued* | gate. Should the use of acid be necessary, a solution of one (1) part muriatic acid to five (5) parts of water may be used, but as soon as the aggregate has been exposed, particular care shall be taken to remove all trace of the acid by spraying with clean water from a hose.<br><br>30. (Smooth Troweled.) Finishing coat shall be smoothed with a metal trowel, with as little rubbing as possible.<br><br>31. (Stippled.) Finishing coat shall be smoothed with a metal trowel, with as little rubbing as possible, and then shall be lightly patted with a brush of broom straw to give an even stippled surface.<br><br>32. (Sand Floated.) Finishing coat, after being brought to a smooth even surface, shall be rubbed in a circular motion with a wood float. This floating shall be done when the mortar has partially set.<br><br>33. (Rough Cast or Spatter-Dash.) After the finishing coat has been brought to an even surface and before attaining its final set, it shall be uniformly coated with a mixture of one (1) part *white* cement to two (2) parts *white* sand, thrown forcibly against the wall in such a manner as will produce a rough surface of uniform texture.<br><br>34. (Pebble Dash or Exposed Aggregate—Cast on Method.) After the finishing coat has been brought to an even surface and before attaining its initial set, the aggregates shall be forcibly thrown against the mortar and embedded therein. Aggregates shall vary in size from ¼-inch to ⅜-inch, and shall be well wetted before being cast on. They may be pressed into the mortar with a clean wooden float but the surface shall not otherwise be disturbed.<br><br>NOTE.—The above surface finishes are alternative. Under no circumstances should the stucco be worked after it has attained its initial set. | | |
| Samples. | 35. Samples of the surface finish shall be laid up well in advance of the work and the approved sample shall be carefully preserved during the prosecution of the work and used as a standard. | | |

## Notes for Other Sections of Specifications

| | | | |
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| | | The success of stucco on wood frame construction is as dependent upon the character of the framework as it is of the stucco itself. A well braced and rigid framework is absolutely essential. The following provisions are presented as a standard of good practice in this regard. | |
| Framing. | | The studs should be spaced 16 inches on centers and be continuous from main sill to rafter plate, with 1x6-inch ribbons housed into studs to support the floor joists and tie the studs together. No girts or other horizontal grained members should intervene. The floor joists should be securely spiked to the studs. | |
| Bridging. | | No bridging is required. | Once in the height of each story, the stud walls should have a row of 2x3-inch bridging cut in diagonally between the studs and securely spiked to them. |

| | BRICK AND HOLLOW TILE WALLS | SHEATHED FRAME WALLS | SKELETON FRAME WALLS |
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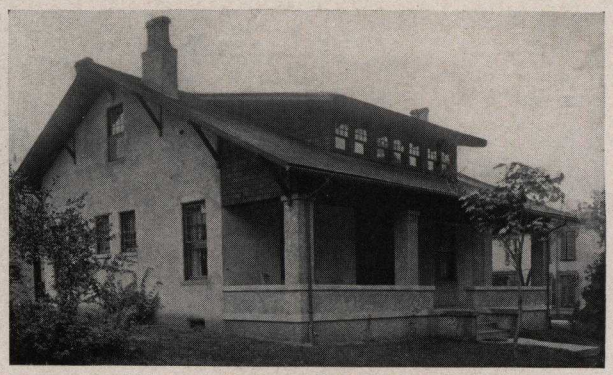
| Sheathing. | | Matched or ship-lap sheathing, dressed one side to a thickness of 7/8-inch, not less than 6 or more than 8 inches wide, should be laid horizontally over the studs and fastened with not less than two 8d nails at every bearing. | No sheathing is required. |
| Water-proofing. | | Sheathing boards should be covered with a felt, thoroly waterproofed by impregnation with tar or asphalt—not a sheathing paper—well lapped and tacked at joints and well flashed and tacked about openings. | The outer face of studs and the sides for a distance of 2 inches back from the face, should be thoroly coated with a pitch or asphalt compound, to interpose waterproofing between the stucco and the framework. |
| Insulation. | | When greater insulation than the waterproof felt affords, is desired, such as quilting or corrugated paper, this insulation should be placed between the waterproof paper and the sheathing. | After the stucco lath has been back-plastered, the air space between the studs may be divided by applying between the bridging and the inside plastering, quilting or other insulating material, fastening it in place by nailing wood strips over the fold in the paper, on the sides of the studs. |
| Furring. | | Unless metal furring is used, or a lath of which metal furring forms an integral part. the wall should be furred over the waterproof paper with 1x2-inch strips placed vertically 16 inches on centers and about openings. | Unless metal furring is used, or a lath of which metal furring forms an integral part, the wall should be furred with 1x2-inch strips placed vertically on the studs and about openings. |
| Sills. | | Sills of openings should have ample slope and projection and undercut drips. | Sills of openings should have ample slope and projection and undercut drips. |



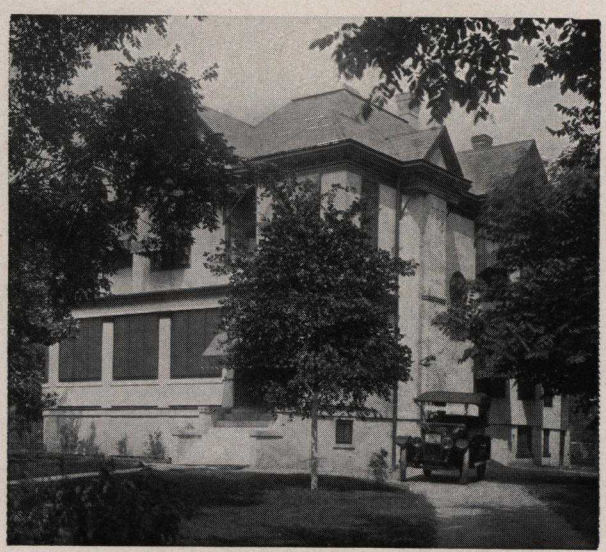
*Residence of Albert Schmids, Springfield, Ohio, before and after stuccoing. F. Miller, Architect. C. Ohmart, Stucco Contractor*

# New Homes for Old

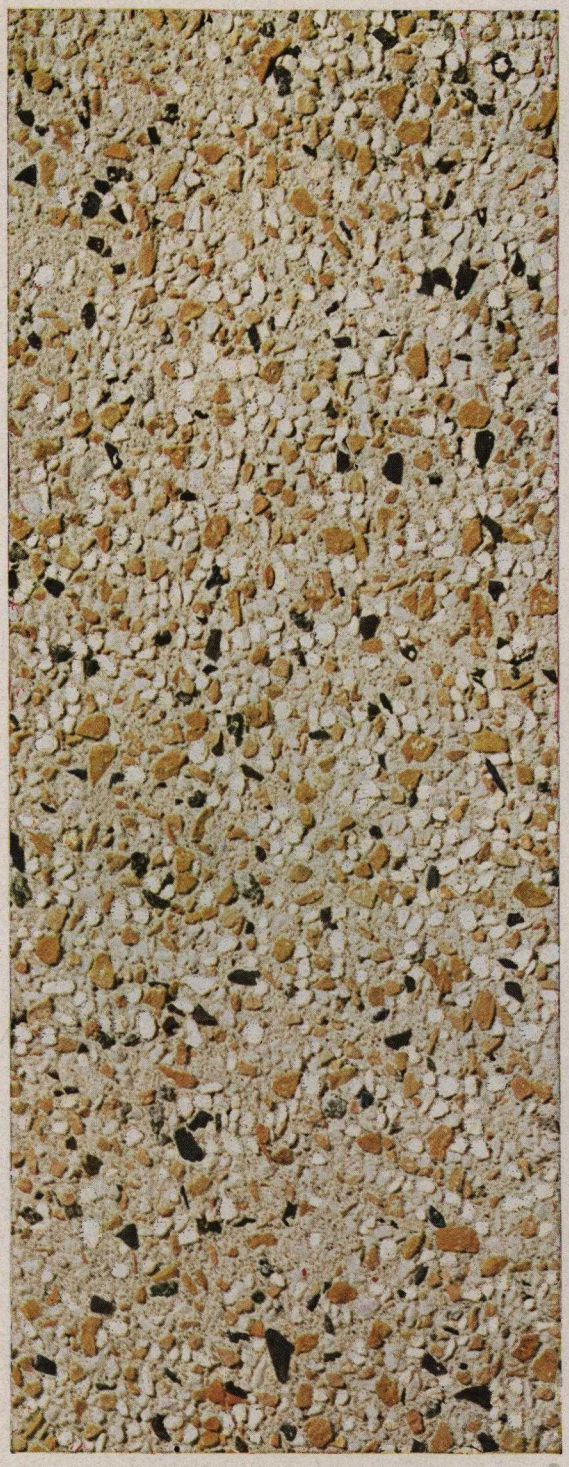
THE renovation of old buildings by overcoating them with stucco is a very timely subject. As a rule, stucco is almost certain to make an ugly exterior attractive.

In renewing an exterior of old brick or stone the stucco can be applied directly to the surface, provided it is thoroughly cleaned so as to give the stucco a good grip or bond. Pick out the old mortar joints ½ to ¾-inch from the face of brick work. Before applying the stucco saturate the brick with water so that none will be absorbed from the stucco coating. If the old brick work has been painted, remove all the paint with a lye solution, or scrape it off.

When "overcoating" old frame houses, examine the foundation and frame to ascertain whether it has sufficient strength to bear the additional weight of the stucco. If it has, bring the outside walls into plumb by furring when the metal lath is applied. Remove poor weather-boarding that will not hold furring nailed to it. Where the furring is placed over old clapboards, extend the old window and door frames to come flush with the finished stucco surface. In some cases the mortar may be turned into the old frames to make a stucco recess. When the furring is fastened direct to the sheathing it is not necessary to provide for extending window or door frames, as the new stucco will take the place of the old clapboards.

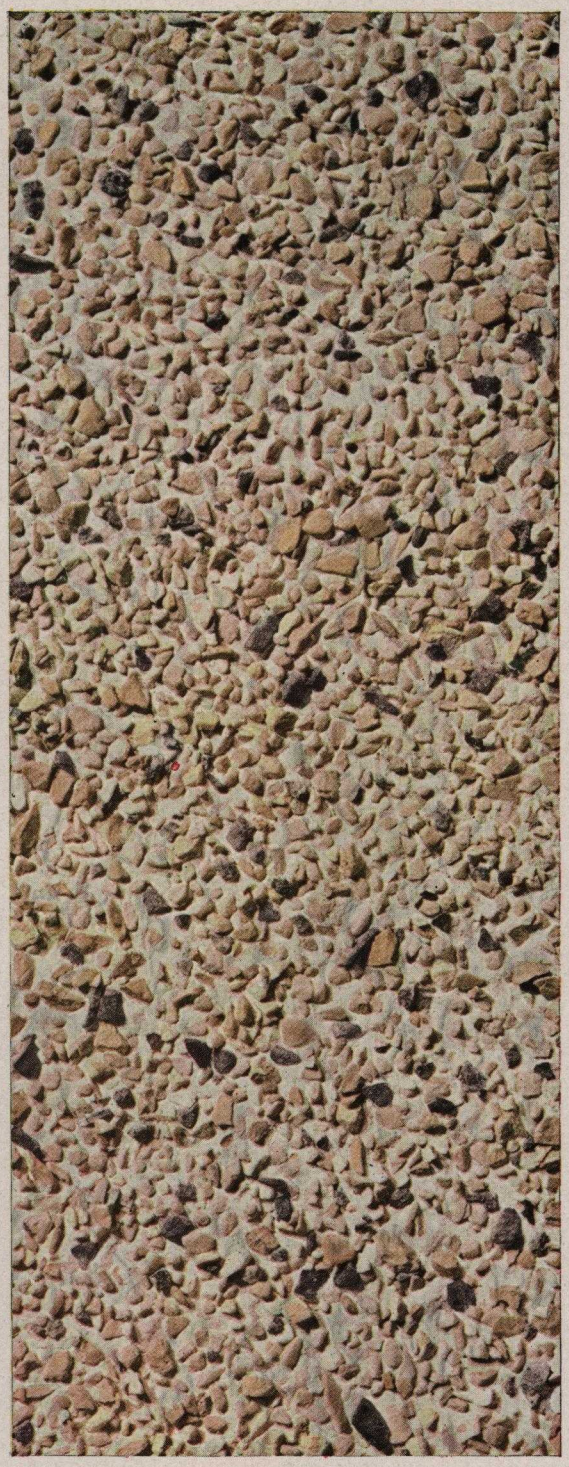


*Residence of H. H. Holliday, Cairo, Ill., built 1891 and Stuccoed in 1914. C. L. Buchanan, Contractor*



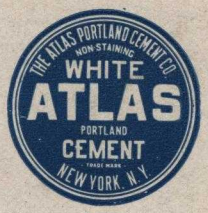
COLOR AGGREGATE STUCCO PLATE XII

Made of one and one-half parts Atlas-White Cement, three parts white sand, and two parts aggregates composed of one part white marble, No. 1 size, one part yellow marble, No. 1 size, one-tenth part green marble, No. 1 size, and one-tenth part black marble, No. 1 size, mixed and applied for finish coat. Surface was then washed.



COLOR AGGREGATE STUCCO PLATE XIII

In making this panel one part Atlas-White Cement and two parts white sand were mixed together and applied for the finish coat. While the surface was still fresh, a mixture of the same aggregates as used in Plate XII were cast on and pressed in lightly with a float. The texture resulting is especially charming.




# Atlas-White

## Non-Staining Portland Cement

ATLAS-WHITE is a true Portland Cement of the same high quality as gray Atlas Portland Cement. The contractor will find it of advantage in his work, as a beautiful, pure-white finish for stucco, and for making pre-castments, such as masonry trim, garden furniture, and for pointing and setting stone, tile and brick, where a white joint is desired. Atlas-White is non-staining and should be used for setting all fine texture stone, both exterior and interior.

By mixing color aggregates or mineral pigments with Atlas-White Cement for the final stucco coat, many charming mellow tones are available, adding greatly to the distinctiveness and individuality of stucco for home construction. Atlas-White gives the true color value of the aggregates and pigments used, making possible the soft cream and buff effects and reproductions of fancy stone and marble that are not possible with gray Portland Cement.

## Information for Contractors

It has been the aim of this book to cover the main features of stucco construction. If there are any details not included about which the contractor may desire information, our Technical Department will be pleased to furnish full information.

Books on stucco which will be found of value in discussing stucco with your clients are—

"Information for Home Builders"
"Building a Bungalow"
"Choosing the Garage"
"New Homes for Old"

Copies of these will be sent to any contractor upon request.

## The Atlas Portland Cement Company

*Member of the Portland Cement Association*

30 Broad St., New York — Corn Exchange Bank Bldg., Chicago

Philadelphia Boston St. Louis Minneapolis Des Moines Dayton Savannah


# Atlas-White

## Non-Staining Portland Cement

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